c) Remarks

The claims are 1, 3-8 and 12 with claim 1 the sole independent claim. Claim 1 was amended to better define the intended invention. Claims 3, 4, 6 and 7 were amended to resolve informalities. Reconsideration of the claims is requested.

The objection to claim 7 was resolved by deleting the term "any". Claim 1 has been amended as supported by page 5, lines 1-5 and by page 7, line 1 to page 8, line 24.

Claims 1-3, 5, 9 and 10 were rejected as anticipated by Fiedler '387. Claims 4, 6-8, 11 and 12 were rejected as obvious over Fiedler '387 in view of the APA. The grounds of rejection are respectfully traversed.

Prior to addressing the art rejection applicants wish to briefly review certain key features and advantages of the present claimed invention.

The present invention provides the following technical advantages:

1.) A decrease in melting point of metal nanoparticles

When the size of noble metal particles is of the order of nanometers, the melting point thereof, which, for silver, for example, is 961.93 ℃ under normal conditions, decreases to much lower temperatures (about 150 ℃ for silver). In general, metal particles on the order of nanometers in size melt at quite low temperatures. At a temperature of only 150° C, paper or PET is not affected by a baking treatment. At low temperatures the metal particles in holes in the porous surface of the substrate melt and combine with the metal particles on the porous surface. See page 8, lines 15-24.

2.) Anchor effect

Silver nanoparticles, for example, present in both the porous layer and outside the porous layer melt at 150 °C and combine with each other to anchor the metal in and on the substrate. See page 8, line 19 and page 16, line 14. At that time, the relationship $\phi 1\ ave \geq \phi 2\ ave$ holds. See page 16, lines 1-10. Thus, more than half of the silver nanoparticles that have a uniform size remain on the surface of the porous layer comprising the pseudobehmite. This feature enables formation of a wiring portion that (i) has a large cross-section, (ii) is strong, and (iii) has a smooth surface. Further, the remaining silver nanoparticles comprising less than half of the silver nanoparticles (that have a size smaller than that of the pores) move into the pores of the porous layer and melt at 150 °C. These melted particles stick together, thus being unable to move out of the pores.

At the same time, the larger size silver nanoparticles, on the surface of the porous layer, melt and stick to each other. As a result, a considerably strong anchor effect is produced between the coalesced silver on the surface and within the pores of the surface. Moreover, since more than half of the silver nanoparticles have a size larger than that of the pores, the number of silver nanoparticles which can pass through the pores to reach the next wiring portion is extremely small, so that short circuits in the wiring are suppressed. These features are described at page 8, line 11 to page 9, line 8 and at page 16, lines 11-19.

3) <u>Savings in production</u>

The manufacturing method according to the present invention can be conducted by using conventional bubble jet printing techniques and, hence, can be carried out efficiently at low cost.

With regard to the rejection of claim 1, as pointed out in the outstanding Office Action, Fiedler '387 states "the surface intended for deposition of the metal layer can be covered by a porous layer" (column 10, lines 6-7). In contrast thereto, in the present claimed invention the porous layer is covered by a metal layer, which is the opposite structure of Fiedler.

Similarly, Fiedler states "The illuminated substrate is then dried in a hot air oven and is then available for <u>conventional chemical metallization</u>, for example with a nickel-boron layer (NiB)" (column 8, lines 57-59). (emphasis supplied) In contrast thereto, the present invention uses low temperature melting of nanoparticles, to form the metallic layer which is different in kind from the chemical metallization of Fiedler. Moreover, the anchor effect of the present invention is not obtained with chemical metallization. In metallization a laser beam can raise the temperature of a target surface many hundreds of degrees, See Fiedler, columns 5 and 6.

Fiedler '387 uses chemical metallization to form the metal layer, which is a technique far different from the low temperature melting of nanoparticles as used in the present claimed invention. On page 9, lines 9-17 the metal layer is formed by drying. The drying is conducted, for example, with hot air or infra-red radiation using an oven or lamp. This is a low temperature drying step, which is different from a chemical metallization step.

With respect to the Examiner's allegation in the Office Action on page 6, lines 6-12 "Regarding claim 8, ... will not be so great", this statement is incorrect. Even if the

relationship $\phi 1\ ave \geq \phi 2\ ave$ is not satisfied, ink is absorbed in paper. However, if the relationship $\phi 1\ ave \geq \phi 2\ ave$ is not satisfied, silver nanoparticles pass deeply into the paper surface, thereby providing a wiring that has a rough surface, is cut off, and has a high resistance. In the present invention, the relationship $\phi 1\ ave \geq \phi 2\ ave$ is preferred. Thus, more than half of the silver nanoparticles that have a uniform size, remain on the surface of the porous layer comprising the pseudobehmite, which enables formation of a wiring portion that has a large cross-section, is stronger, and has a smoother surface.

Furthermore, with regard to claim 12, for a FET which uses an organic semiconductor material, the mobility (charge mobility) of the FET improves with increasing surface smoothness of the source and drain electrodes.

The claims should be allowed and the case passed to issue.

Applicants' undersigned attorney may be reached in our New York office by telephone at (212) 218-2100. All correspondence should continue to be directed to our below listed address.

Respectfully submitted,

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